WALLES
Serial No. 09/902,804

Atty Dkt: 2380-380
Art Unit: 2664

AMENDMENTS TO THE SPECIFICATION:

Please amend paragraph [00025] beginning at page 6, line 16, as follows:

The node 20 has a chain of processing units through which a media stream of packets is routed for sequentially processing of each packet of the media stream. As a generic, non-limiting example, the node 20 of Fig. 1 is shown as having four such processing units 30_1 through 30_4. The input unit 22, output unit 24, and chain of processing units are interconnected by a packet distribution system 32 (e.g., packet switch). The dashed line 34 of Fig. 1 represents an example path or sequence traversed/experienced by a media stream packet which travels through node 20. After arriving at input unit 22, the packet is routed by packet distribution system 32 successively through each of processing units 30_1 through 30_4, and then out of node ~~2o~~ 20 via output unit 24.

Please amend paragraph [00031] beginning at page 8, line 18, as follows:

Fig. 3 depicts various delays that can occur in the nodes which utilize the invention, such as node 20 of Fig. 1 and/or node 20-2 of Fig. 2. As shown in Fig. 3, a media stream packet experiences a potential delay Tin in input unit 22 and a potential delay Tout at output unit 24. In addition, the media stream packet can experience potential delays T1, T4, T7, T10, and T13 in traveling (e.g., through packet distribution system 32) between the various boards of the node. For example, a delay T4 occurs when a packet travels from processing unit 30_1 to processing unit 30_2; a delay ~~T6~~ T7 occurs when a packet travels from processing unit 30_2 to processing unit 30_3; and so forth. A potential delay can also occur at each of the processing units 30.

Please amend paragraph [00032] beginning at page 8, line 27, as follows:

For a node such as node 20-2 of Fig. 2 which has a queue-associated processing unit, the intra-node performance monitoring packet(s) can include several components of the time spent by the packet of the media stream in the processing unit. For example, the intra-node performance monitoring packet issued from a particular processing unit 30 can include a first component which is a delay experienced by the packet of the media stream attributable to processing performed by processing unit, and a second component which is a delay experienced by the packet of the media stream attributable to the queue associated with that processing unit. For processing unit 30_1, a delay T2 can be encountered in input queue (Q) 44_1 while a delay T3 can be experienced in media processing function (MPF) 46_1. Similarly, for processing unit 30_2, a delay T5 can be encountered in input queue (Q) 44_2 while a delay T6 can be experienced in media processing function (MPF) 46_2, and so forth for the other processing units 30_3 and 30_4.

Please amend the paragraph [00036] beginning at page 10, line 11, as follows:

Fig. 4 illustrates as time T14a the time required for a switch monitor packet to travel from performance monitoring server 40 to processing unit 30_1. The processing unit 30_1 then (optionally) queues and returns the intra-node performance monitoring packet. Fig. 4 further illustrates as time ~~14b~~ T14b the time required for a returned intra-node performance monitoring packet to travel from processing unit 30_1 to performance monitoring server 40. In one example technique of the invention, the performance monitoring server 40 then derives from the times T14a and T14b an estimation of the time required for the media stream packet to travel from processing unit 30_1 to 30_2 (e.g., time T4). For example, performance monitoring server 40 may estimate time T4 to be one half of the sum of T14a + T14b. Similar approximations are derived for other

routing-caused delays, e.g., time T6 can be approximated as one half the sum of T15a + T15b; time T7 can be approximated as one half the sum of T16a + T16b; and so forth.

Please amend the paragraph [00042] beginning at page 11, line 25, as follows:

The processes and functions illustrated in Fig. 5A as comprising a processing unit 30 include media stream processing function 60; supervisory process 61; packet queuing operation 62; performance monitoring process 63; a process 64 for returning a switch monitor packet; and packet discharge process 65. The supervisory process 61 is thus shown in Fig. 5A as being connected by dashed –double dotted lines to each of packet queuing operation 62; performance monitoring process 63; a process 64 for returning a switch monitor packet; and packet discharge process 65. The processes and functions illustrated in Fig. 5B as comprising performance monitoring server 40 include packet reception/discrimination process 80; switch monitor packet generator 81; supervisory process 82; stream ID supply process 83; stream grouping process 84; media stream delay calculation processes 85; switch delay calculator 86; filter 87; and user interface (output/display process) 89.

Please amend the paragraph [00052] beginning at page 14, line 3, as follows:

Upon receiving the process end time (T_{PE}) for a media stream packet, the performance monitoring process 63 is able to prepare an intra-node performance monitoring packet with respect to the media stream packet if authorized to do so. In one mode of the invention, the performance monitoring process 63 can prepare an intra-node performance monitoring packet for every media stream packet processed by processing unit 30. In another mode, an intra-node performance monitoring packet generated for every x^{th} (x is an integer) media stream packet processed by the processing unit 30.

Preferably the second mode is employed in order not to impose too much load on the node. In one example implementation, in such second mode x has a value of about ten. The particular mode (and, for the second mode, the value of x) is communicated to performance monitoring process 63 by supervisory process 61. The involvement of supervisory process 61 in coordinating and controlling the various operations of processing unit 30 are depicted by the dashed/double-dotted lines of Fig. 5A.

Please amend the paragraph [00053] beginning at page 14, line 17, as follows:

Fig. 5A and Fig. 5B show as event 5-12 the transmission of an intra-node performance monitoring packet from performance monitoring process 63 of processing unit 30 to performance monitoring server 40. An example format of an intra-node performance monitoring packet 100 is shown both in Fig. 5A and Fig. 5B. The intra-node performance monitoring packet 100 has a header or the like which includes, e.g., an origination address (the particular processing unit 30 which generated the intra-node performance monitoring packet) and a destination address (i.e., the address of performance monitoring server 40). In the event that that the origination address is insufficient to identify the nature of the processing performed at processing unit 30, a media processing function identifier (MPF #) can also be included in the intra-node performance monitoring packet 100. The intra-node performance monitoring packet 100 further includes the stream ID which, as mentioned above, may have to be sought (in the manner of event 5-3) from performance monitoring server 40. The intra-node performance monitoring packet 100 also includes the delay time components mentioned previously, e.g., the first component (process time) and the second component (queue time). The first component (process time) is computed as the difference between the queue departure time (T_{QD}) for the media stream packet received as event 5-6 and the queue arrival time (T_{QA}) for the media stream packet received as event 5-2.

Please amend the paragraph [00057] beginning at page 16, line 5, as follows:

Upon receiving an intra-node performance monitoring packet, packet reception/discrimination process 80 forwards the intra-node performance monitoring packet to stream grouping process 84 as event 5-16. Since intra-node performance monitoring packets are typically arriving at the node from several media streams, the stream grouping process 84 groups the intra-node performance monitoring packets in accordance with the media streams for which they were generated, using the stream ID as a criteria for such grouping or classification.

Please amend the paragraph [00059] beginning at page 16, line 22, as follows:

The filtered and grouped intra-node performance monitoring packets for a media stream are forwarded as event 5-18 to a respective one of media stream delay calculation processes 85 included in performance monitoring server 40. Each media stream delay calculation processes 85 makes a calculation regarding the total delay time occasioned by each processing unit 30, as well as the overall delay time in the node experienced by media stream packets belonging to the respective media stream. For example, for media stream delay calculation process 85_1, and assuming that all four processing units 30_1- 30_4 are utilized for the media stream handled by media stream delay calculation process 85_1, the overall node delay calculation can be the T2+T3+1/2(T14a+T14b)+T5+T6+1/2(T15a+T15b)+T8+T9+1/2(T16a+T16b) +T11+T12 computation described previously with reference to Fig. 4, or the reduced expression T2+T3+T5+T7+T8+T9+T11+T12 if inter-unit delays are negligible. When the more complex expression is utilized, such switch monitor packet-related quantities as 1/2(T14a+T14b), 1/2(T15a+T15b), and 1/2(T16a+T16b) are obtained from switch delay calculator 86 as event 5-19.